



# OBSERVATION AND FORECASTING FOR COASTAL RESILIENCE: INDONESIA

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## LANDSCAPE

- Socio-geographical context
- Risks from hazardous event
- Challenges for ocean monitoring



## OBSERVATION NETWORK



## SERVICES SUPPORTING COASTAL RESILIENCE



Areas prone to Sea Level Rise. Source: Forster (2011)

## Socio-geographical context:

- Country 99.000 km long of coastline, 2<sup>nd</sup> longest coastline in the World (after Canada), but higher number of population living in coastal cities and coastal area.
- High economic activity.

## Hazardous events:

- Highly vulnerable to sea level rise.
- Threats from high waves, surges, tides, tropical cyclones and tsunamis.

## Other anthropogenic factor:

- Land subsidence in major areas.

## Need to enhance the existing early warning information services.

The combined effects those factors pose substantial risks to society, as well as to the sustainability of ecological systems and the economy.

True size  
comparison of  
Indonesia with  
Europe.

From: [thetruesize.com](http://thetruesize.com)





## Large gap in ocean monitoring:

- High costs (also for maintenance ~30% of total annual budget).



## Damage and loss of instruments from:

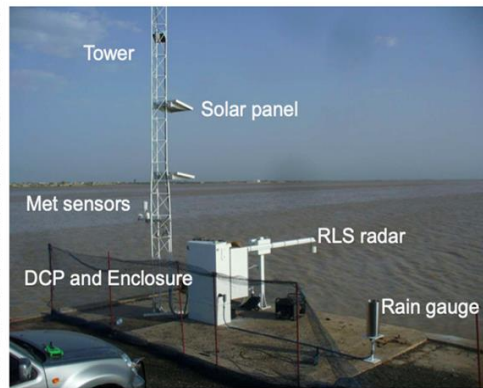
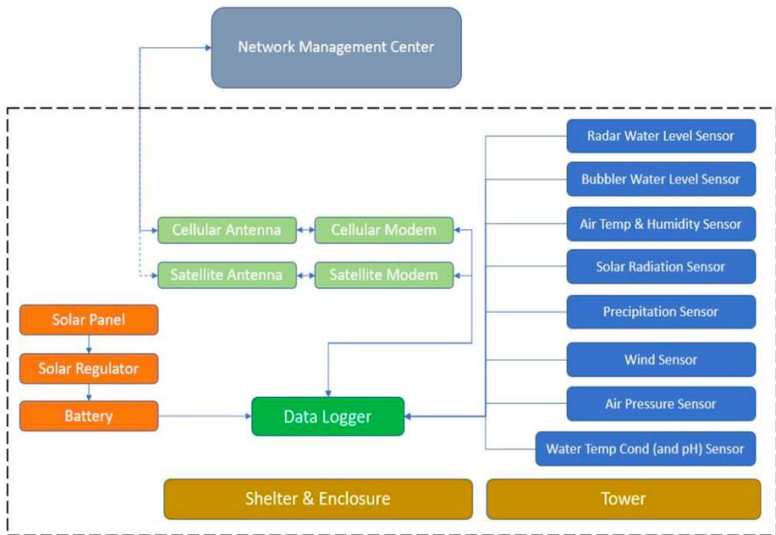
- Vessel collision.
- Unintended entanglement from fishing nets.
- Theft and vandalism.



## Other anthropogenic factor:

- Marine debris.

# NETWORK OF MARINE AUTOMATIC WEATHER SYSTEM



- Existing 40 instruments of marine system are distributed throughout Indonesia,
- In the process to be expanded with a total investment 150Mil US\$.



# INA-WIS

Indonesia - Weather Informations for Shipping

## MARINE OBSERVATION, MONITORING, AND FORECAST



Search for Location ...

Log in

Significant Wave Height

Sea Current

Wave Mean Period

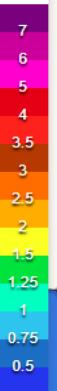
My Fleet

Route Planner

Weather Impact

- Vessel
- Port
- OFS
- Fishing Ground
- Himawari-8 IR Enhanced
- Altimetri
- Sea Current Condition
- Radar Maritim
- Radar Cuaca

meter



2023-12-05 18:00:00



2023-12-01 00:00:00

2023-12-03 12:00:00

2023-12-06 00:00:00

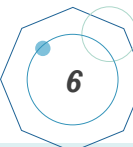
2023-12-08 12:00:00

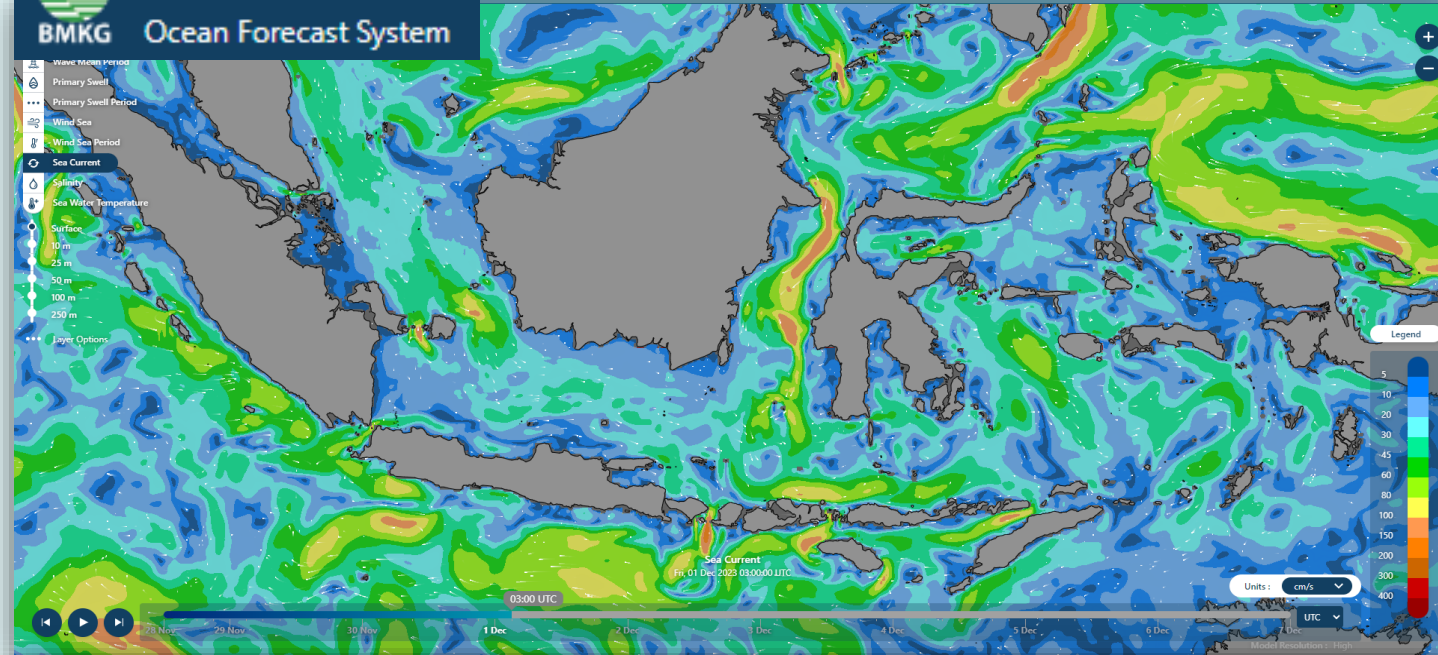
2023-12-11 00:00:00



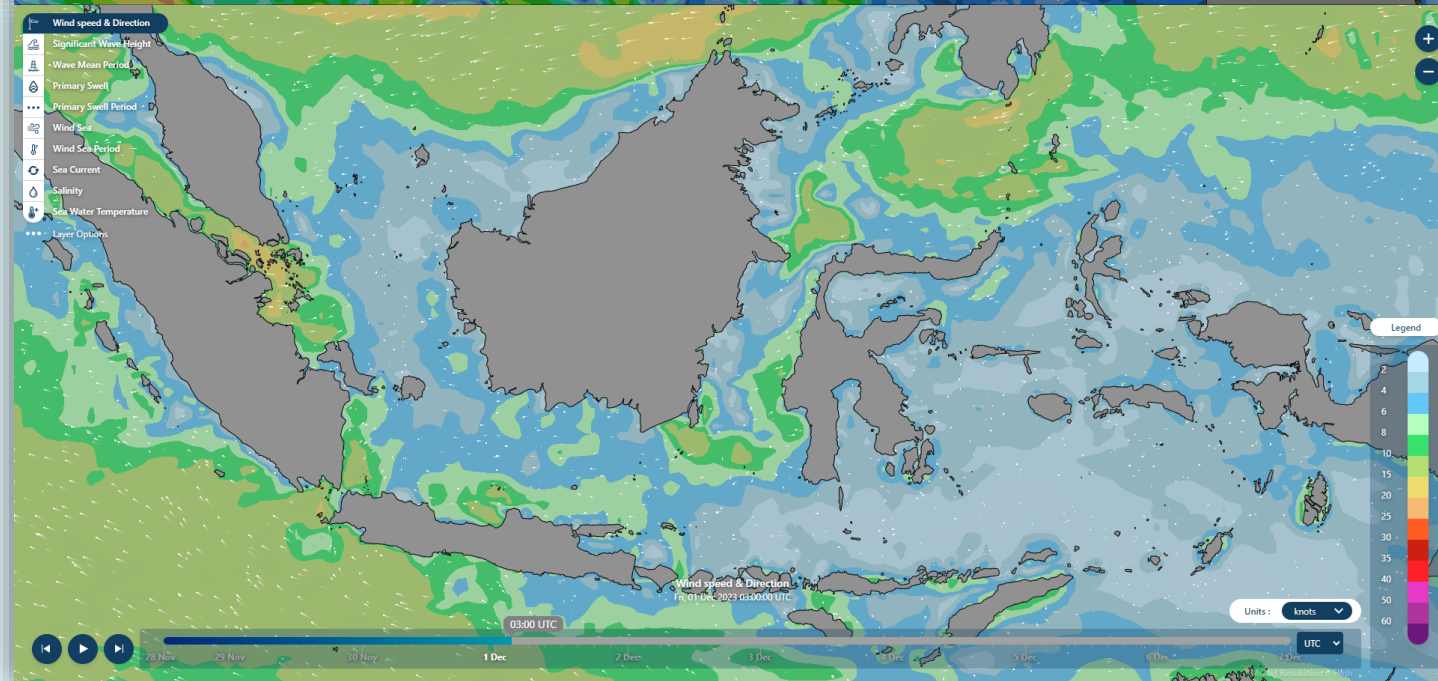
Wave monitoring and prediction for shipping, transportation, fisheries, and tourism.

<https://maritimbnkg.go.id/inawis>





### SEA CURRENT



### SURFACE WIND SPEED AND DIRECTION

### OTHERS

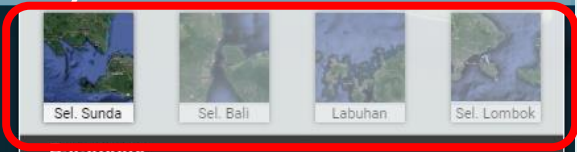
- Primary swell
- Sea water temperature
- Salinity
- etc.



# HF Radar Data Viewer

Sea surface current & wave data information

# MARINE OBSERVATION, MONITORING, AND FORECAST



Parameter

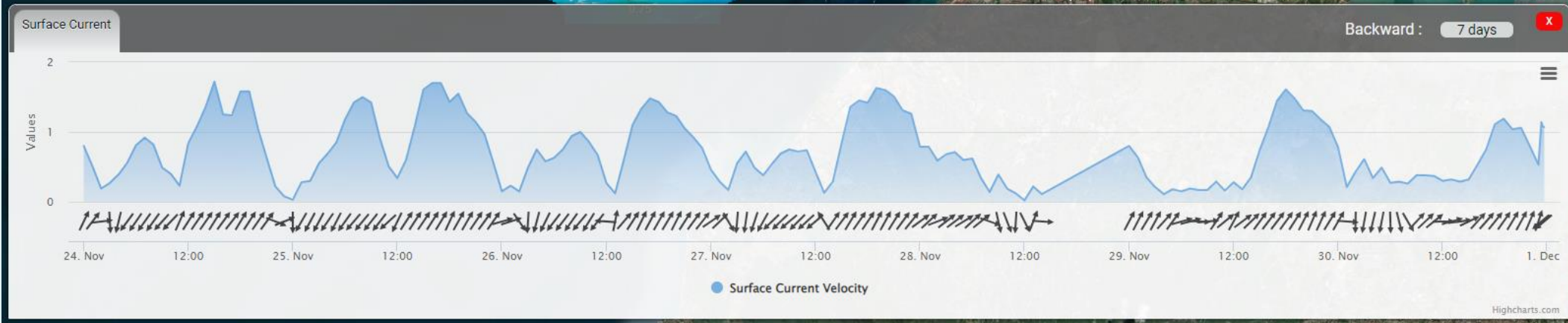
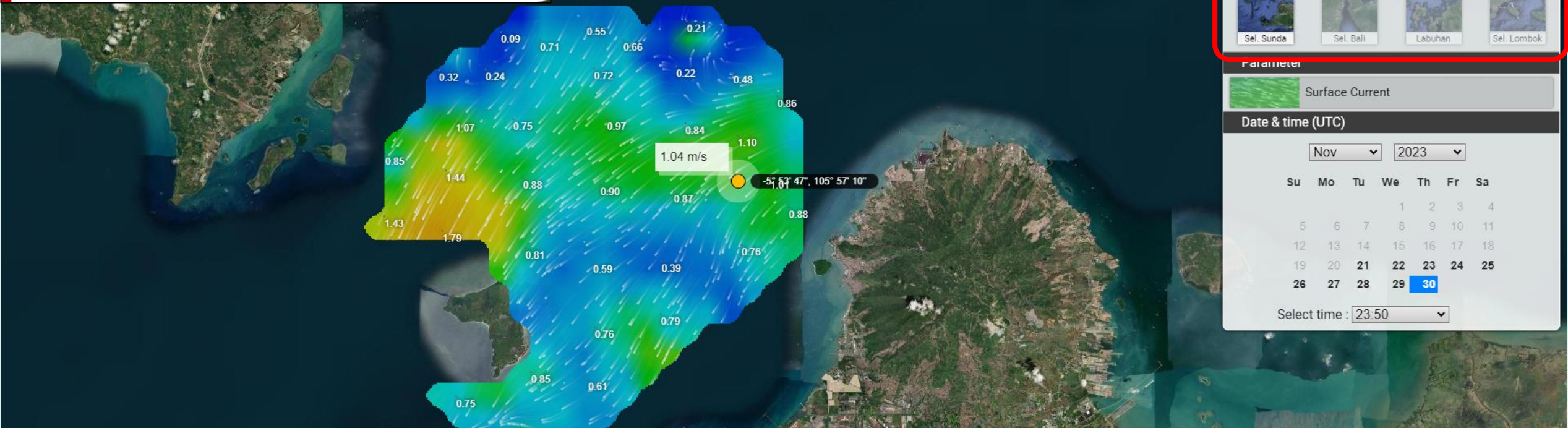
Surface Current

Date & time (UTC)

Nov 2023

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

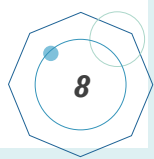
Select time: 23:50



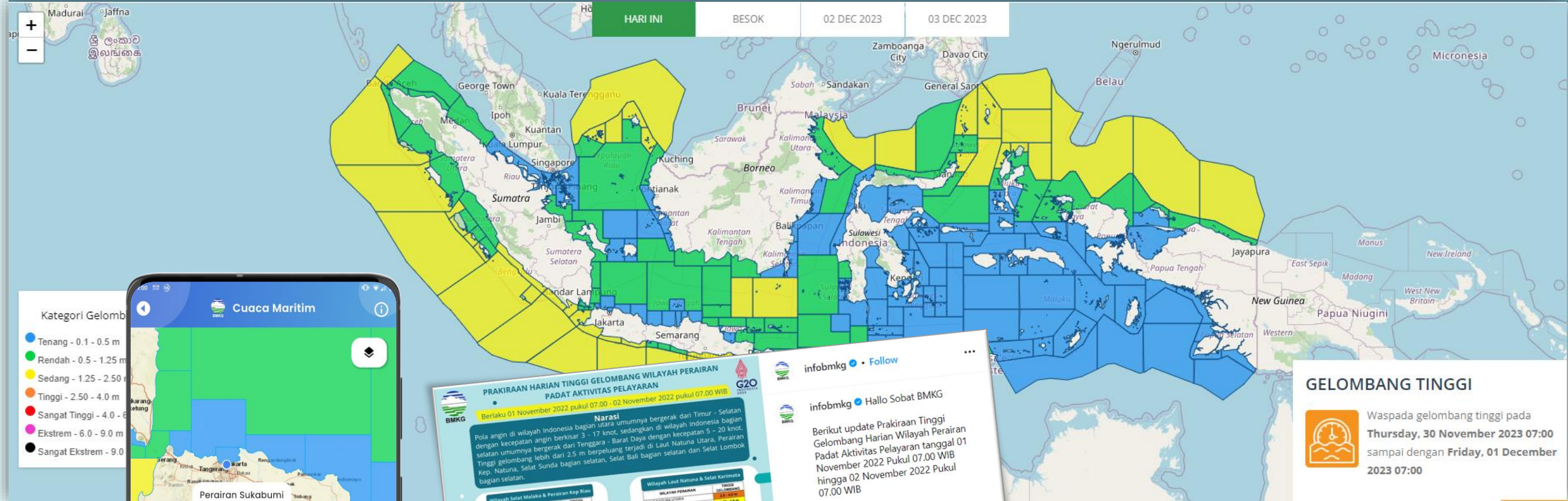
Latest update : 2023-11-30 11:50 UTC  
 Unit : m/s

A few critical and important Archipelagic Sea Lanes for shipping have HF Radar deployed and installed.

<https://maritimbrkg.go.id/radar>







- Kategori Gelomb
- Tenang - 0.1 - 0.5 m
  - Rendah - 0.5 - 1.25 m
  - Sedang - 1.25 - 2.50 m
  - Tinggi - 2.50 - 4.0 m
  - Sangat Tinggi - 4.0 - 6.0 m
  - Ekstrem - 6.0 - 9.0 m
  - Sangat Ekstrem - 9.0 m



**PRAKIRAAN HARIAN TINGGI GELOMBANG WILAYAH PERAIRAN PADAT AKTIVITAS PELAYARAN**

Berlaku 01 November 2022 pukul 07.00 - 02 November 2022 pukul 07.00 WIB

**Narasi**  
Pola angin di wilayah Indonesia bagian utara umumnya bergerak dari Timur - Selatan dengan kecepatan angin berkisar 3 - 17 knot, sedangkan di wilayah Indonesia bagian selatan umumnya bergerak dari Tenggara - Barat Daya dengan kecepatan 5 - 20 knot. Perairan Tinggi gelombang lebih dari 2.5 m berpeluang terjadi di Laut Natuna Utara, Perairan Kep. Natuna, Selat Sunda bagian selatan, Selat Bali bagian selatan dan Selat Lombok bagian selatan.

Wilayah Perairan	Tinggi Gelombang
Wilayah Laut Maluku & Perairan Kep Riau	0.1 - 0.5 m
Wilayah Laut Jawa & Selat Sunda	0.5 - 1.25 m
Wilayah Selat Makassar	0.5 - 1.25 m
Wilayah Laut Natuna & Selat Karimata	1.25 - 2.50 m
Wilayah Bali dan Nusa Tenggara	2.50 - 4.0 m
Wilayah Maluku dan Papua	4.0 - 6.0 m

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Berikut update Prakiraan Tinggi Gelombang Harian Wilayah Perairan Padat Aktivitas Pelayaran tanggal 01 November 2022 Pukul 07.00 WIB hingga 02 November 2022 Pukul 07.00 WIB

Informasi selengkapnya :  
maritim.bmkg.go.id

Demikian disampaikan, semoga bermanfaat

#infoBMKG #infogelombang #BerAkhlaK

56w

516 likes  
October 31, 2022

Log in to like or comment.

**GELOMBANG TINGGI**

Waspada gelombang tinggi pada  
**Thursday, 30 November 2023 07:00**  
sampai dengan **Friday, 01 December 2023 07:00**

Forecasts information and warning can be easily accessed through many platforms, and also custom disseminated to maritime authorities.

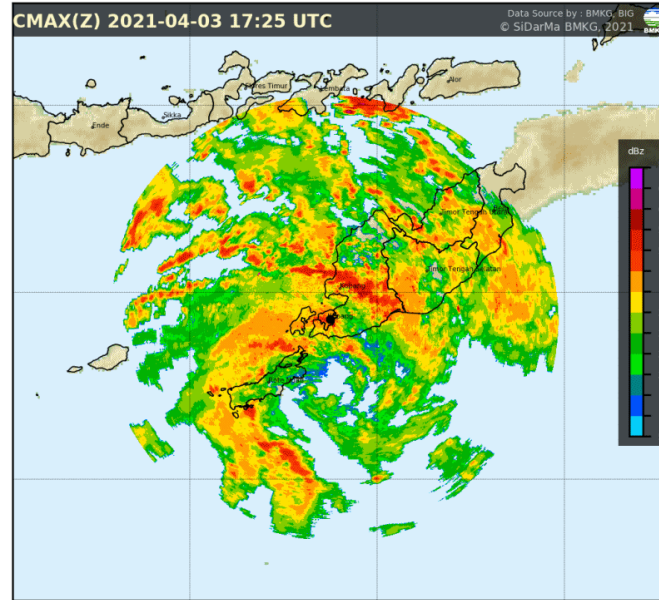


Trainer of the Fishermen Weather Field School on board a fishing boat.



Fishermen being trained to understand BMKG's marine weather and warning information.

## SUCCESS STORY



Severe **Tropical cyclone Seroja** hit the Kupang coastal area in April 2021, 272 casualties with loss and damage estimated US \$500 million.

A portrait of a man wearing a white shirt and a light blue face mask. He is looking directly at the camera. The background is a blue sky with white clouds and some abstract white lines. In the top left corner, there is a logo for "76th INDONESIA TANGGUH INDONESIA TUMBUH" and "BMKG".

**Pak Dewa Selamatkan Jiwa Warga Desa Oesapa NTT**

Setelah saya mendapatkan informasi dari BMKG mengenai Siklon Tropis Seroja akan datang, hal pertama yang saya lakukan adalah menyampaikan kepada warga. Saya bersyukur sempat memberi peringatan kepada warga desa, meski ada rekan saya yang masih di tengah laut harus menjadi korban, karena tidak mendapatkan pesan dari telepon karena tidak ada sinyal.

**Muhammad Mansur Dokeng (Pak Dewa)**  
Warga Kampung Nelayan Oesapa,  
Nusa Tenggara Timur

#Info BMKG Kawal  
Indonesia Tangguh dan Tumbuh

www.bmkg.go.id @InfoBMKG @InfoBMKG @InfoBMKG @InfoHumasBMKG @InfoBMKG Copyright | Humas BMKG

*Mr. Dewa, alumnus of the fishermen weather field school saved his entire village during Tropical Cyclone Seroja, due to the increased literacy and understanding of marine weather information and warnings from BMKG.*

## Importance of ocean and coastal observation and services:



Sustained ocean observation and services is very essential in supporting resilience against climate change and other related oceanic hazards.



It supports sustainable livelihoods for coastal communities and coastal cities.



Ocean and coastal monitoring is costly, requires partnerships beyond public sector for sustained ocean observation.



Last mile interfacing is also crucial: increasing weather-climate literacy for actors from transportation sectors, coastal communities (fishermen), etc, to ensure safety and sustainable livelihood.

# THANK YOU



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<https://bmkg.go.id> 